Plant, Cell and Environment (1990) **13**

Contents

PART 1

1 C, N and P nutrition of *Lernea mamillosa* Kütz. (Batrachospermales, Rhodophyta) in the Dighty Burn, Angus, U.K.
J. J. MacFarlane & J. A. Raven

15 Radial and axial turgor pressure measurements in individual root cells of *Mesembryantheum crystallinum* grown under various saline conditions
J. Rygol & U. Zimmermann

27 Stomatal response to humidity in a sugarcane field: simultaneous porometric and micrometeorological measurements
D. A. Grantz & F. C. Meinzer

39 Water balance in *Hemizonia luzulifolia*: the role of extracellular polysaccharides
S. R. Morse

49 Natural deuterium and oxygen-18 enrichment in leaf water of cotton plants grown under wet and dry conditions: evidence for water compartmentation and its dynamics
D. Yakir, M. J. DeNiro & J. R. Gat

57 Heat shock proteins in *Sorghum bicolor* and *Pennisetum americanum*. II. Stored RNA in sorghum seed and its relationship to heat shock protein synthesis during germination
C. Howarth

65 The effect of chlorophyll content on changes of photochemical reactions in intact kidney bean leaves
M. Koizumi, H. Kano, N. Katsura & K. Inada

73 Reflection signals and the perception by phytochrome of the proximity of neighbouring vegetation
H. Smith, J. J. Casal & G. M. Jackson

79 Chlorophyll fluorescence measured using the Fraunhofer line-depth principle and relationship to photosynthetic rate in the field
G. A. Carter, A. F. Theisen & R. J. Mitchell

85 Wall extensibility and gravitropic curvature of sunflower hypocotyls: correlation between timing of curvature and changes in extensibility
S. L. Bagshaw & R. E. Cleland

105 Blue light effects on stomata are mediated by the guard cell plasma membrane redox system distinct from the proton translocating ATPase: opinion
A. S. Raghavendra

111 Net fluxes and pools of nitrogenous compounds during suspension culture of photoautotrophic *Chenopodium rubrum* cells
E. Beck & U. Renner

123 Salinity response of a freshwater charophyte, *Chara vulgaris*
U. Winter & G. O. Kirst

135 The influence of high levels of brief or prolonged supplementary far-red illumination during growth on the photosynthetic characteristics, composition and morphology of *Pisum sativum* chloroplasts
W. S. Chow, D. J. Goodchild, C. Miller & J. M. Anderson

147 Gas exchange measurements required to predict the newly fixed carbon pool size in a source leaf of corn (*Zea mays* L.)
E. Koshkin & N. N. Tretiakov

155 Lipids, carbohydrates and amino acids exuded from the axenic roots of rape seedlings exposed to water-deficit stress
H. Svenningsson, P. Sundin & C. Liljenberg

163 Stomatal response to humidity in sugarcane and soybean: effect of vapour pressure difference on the kinetics of the blue light response
S. M. Assmann & D. A. Grantz

171 Temperature sensitivity of *in vitro* seedling development of *Dactylorrhiza majalis* (Orchidaceae) with and without a mycorrhizal fungus
H. Rasmussen, T. F. Andersen & B. Johansen

179 Mechanism of calcium-dependent salt tolerance in cells of *Nitellopsis obtusa*: a role of intracellular adenine nucleotides
M. Katsuhara & M. Tazawa

185 Sink control of nitrogen uptake and assimilation during regrowth after-cutting of ryegrass (*Lolium perenne* L.)
A. Ourry, J. Boucaud & M. Duyme

191 Book reviews

PART 2

91 Physiology of the interaction of angiosperm parasites and their higher plant hosts: commissioned review
M. C. Press, J. D. Graves & G. R. Stewart

PART 3

195 Effects of metals on enzyme activity in plants: commissioned review
F. Van Assche & H. Clijsters

207 Stable carbon isotope fractionation by marine phytoplankton during photosynthesis: commissioned review
C. Descolas-Gros & M. Fontugne
219 The relationship between the Rubisco reaction mechanism and models of photosynthesis: opinion
G. J. Collatz, J. A. Berry, G. D. Farquhar & J. Pierce
227 Rapid, bilateral changes in growth rate and curvature during gravitropism of cucumber hypocotyls: implications for mechanism of growth control
D. J. Cosgrove
235 Gravitropism of cucumber hypocotyls: biophysical mechanism of altered growth
D. J. Cosgrove
243 Physiological responses of the mangrove *Rhizophora mangle* grown in the absence and presence of NaCl
A. Werner & R. Stelzer
257 Cloning and characterization of a wound-specific hydroxyproline-rich glycoprotein in *Phaseolus vulgaris*
N. Sauer, D. R. Corbin, B. Keller & C. J. Lamb
267 Photoinhibition in *Vitis californica*: interactive effects of sunlight, temperature and water status
J. A. Gamon & R. W. Pearcy
277 Changes in the concentration of ABA in xylem sap as a function of changing soil water status can account for changes in leaf conductance and growth
J. Zhang & W. J. Davies
287 Some spectral properties of several soil types: implications for photomorphogenesis
D. F. Mandoli, G. A. Ford, L. J. Waldron, J. A. Nemson & W. R. Briggs
295 Abscisic acid mimics effects of dehydration on area expansion and photosynthetic partitioning in young soybean leaves: short communication
J. A. Bunce
299 Book reviews

PART 4

305 Alteration on thylakoid membrane structure in *Brassica rapa* ssp. *oleifera* during ageing in high and low light
A. H. Nurmi
319 Plant respiration in relation to growth, maintenance, ion uptake and nitrogen assimilation
I. R. Johnson
329 Growth, dry weight partitioning and wood properties of *Pinus radiata* D. Don after 2 years of CO_2 enrichment
J. P. Conroy, P. J. Milham, M. Mazur & E. W. R. Barlow
339 Control of photosynthetic carbon dioxide fixation by the boundary layer, stomata and ribulose 1,5-biphosphate carboxylase/oxygenase
I. E. Woodrow, J. T. Ball & J. A. Berry
349 Photosynthetic and stomatal conductance responses to acid mist of red spruce seedlings
D. Eamus & D. Fowler
359 Seasonal dynamics of carbohydrate and nitrogenous components in the roots of perennial weeds
D. R. Cyr, J. D. Bewley & E. B. Dumbroff
367 Growth and carbon allocation in *Pennisetum typhoides* infected with the parasitic angiosperm *Striga hermonthica*
J. D. Graves, A. Wylde, M. C. Press & G. R. Stewart
375 Photosynthesis in chloroplasts rapidly isolated from primary leaves of oat (*Avena sativa* L.): effects of orthophosphate, metal ion and chelators
J. Yu & K. C. Woo
383 Stomatal and hydraulic conductance in growing sugarcane: stomatal adjustment to water transport capacity
F. C. Meinzer & D. A. Grantz
389 Different stomatal responses of maize leaves after blue or red illumination under anoxia
A. Vavasseur, G. Lascève & P. Couchat
395 Aerenchyma formation and associated oxygen movement in seminal and nodal roots of wheat
C. J. Thomson, W. Armstrong, I. Waters & H. Greenway
405 The coleoptile sheath of wheat impedes oxygen transport to seminal roots: short communication
C. J. Thomson & W. Armstrong
407 Book reviews

PART 5

409 Salinity tolerance of *Kosteletzkya virginica*. I. Shoot growth, ion and water relations
K. C. Blits & J. L. Gallagher
419 Salinity tolerance of *Kosteletzkya virginica*. II. Root growth, lipid content, ion and water relations
K. C. Blits & J. L. Gallagher
427 Water-stress-induced xylem embolism in three species of conifers
J. S. Sperry & M. T. Tyree

437 The appearance of a new molecular species of phospho*enol*pyruvate carboxylase (PEPC) and the rapid induction of CAM in *Sedum telephium* L.
A. C. Groenhof, N. Smirnoff & J. A. Bryant
447 Zeta potential measurements of cell wall preparations from *Regnellidum diphyllum* and *Nymphoides peltata*
P. O'Shea, J. Walters, I. Ridge, M. Wainright & A. P. J. Trinci
455 Rehydration-induced changes in pressure-volume relationships of *Artemisia tridentata* Nutt. ssp. *tridentata*
R. D. Evans, R. A. Black & S. O. Link
463 Effects of low-level ozone exposure under ambient conditions on photosynthesis and stomatal control of *Vicia faba* L.
J. M. M. Aben, M. Janssen-Jurkovičová & E. H. Adema
471 Survival and death of *Chara* internodal cells in electrolyte solutions and calcium release from the cell wall
K. Kiyosawa & T. Adachi
477 Effects of inorganic nitrogen sources on spore germination and gametophyte growth in *Botrychium dissectum*
M. A. Melan & D. P. Whittier
483 Ca-Cd interaction in the prymnesiophyte *Cricosphaera elongata*
C. S. Karez, D. Allemand, G. de Renzis, M. Gnassia-Barelli, M. Romeo & S. Puiseux-Dao
489 A controlled-environment chamber for measurement of canopy photosynthesis by small stands of lettuce: technical report
S. J. M. Caporn & W. A. Wood
495 Perception of gravity expressed by vascular differentiation: short communication
M. Gersani & T. Sachs
499 Book reviews

PART 6

501 Mechanism of soybean nodule adaptation to different oxygen pressures
R. Parsons & D. A. Day
513 Homologies to the tomato endopolygalacturonase gene in the peach genome
E. Lee, J. Speirs, J. Gray & C. J. Brady
523 Two forms of exopolygalacturonase increase as peach fruits ripen
C. G. Downs & C. J. Brady
531 Drought-stress-induced polypeptide accumulation in tomato leaves
E. A. Bray
539 Changes in starch and soluble sugars in relation to the acquisition of desiccation tolerance during maturation of *Brassica campestris* seed
O. Leprince, R. Bonchart & R. Deltour
547 An automated greenhouse sand culture system suitable for studies of P nutrition
J. Lynch, E. Epstein, A. Läuchli & G. I. Weigt
555 Photosynthesis of *Ulva fasciata*. IV. pH, carbonic anhydrase and inorganic carbon conversions in the unstirred layer
S. Beer & A. Israel
561 Production of ethylene by gravistimulation: a potential problem with the interpretation of data from some experimental techniques
F. L De Wit, J. Liu & D. M. Reid
569 Oligosaccharides that induce proteinase inhibitor activity in tomato leaf cells
J. F. Thain, H. M. Doherty, D. J. Bowles & D. C. Wildon
575 Two mutants of *Arabidopsis thaliana* that become chlorotic in atmospheres enriched with CO_2
N. N. Artus
581 Book reviews

PART 7

585 Introduction: Signal perception, differential expression within multigene families and the molecular basis of phenotypic plasticity
H. Smith
595 Chloroplast movement
W. Haupt & R. Scheuerlein
615 Light-driven leaf movements
D. Koller
633 Phototropism: mechanisms and ecological implications
M. Iino
651 Chromatic adaptation and the events involved in phycobilisome biosynthesis
A. R. Grossman
667 Plant response to atmospheric humidity
D. A. Grantz
681 Sensing soil oxygen
M. C. Drew
695 Phytochrome, a family of photoreceptors with multiple physiological roles
H. Smith & G. C. Whitelam
709 Sensing of soil water status and the regulation of plant growth and development
W. J. Davies, T. A. Mansfield & A. M. Hetherington
721 Sensing pH?
J. A. Raven
731 Sensing of atmospheric CO_2 by plants
K. A. Mott

739 Light perception in guard cells
E. Zeiger

PART 8

745 Does transpiration have an essential function in long-distance ion transport in plants? Opinion
W. Tanner & H. Beevers
751 Cytokinins and tRNAs: a hypothesis in their competitive interaction via specific receptor proteins: opinion
G. A. Romanov
755 L-acetylcarnitine, a substrate for chloroplast fatty acid synthesis
C. Masterson, C. Wood & D. R. Thomas
767 Inhibition studies on acetyl group incorporation into chloroplast fatty acids
C. Masterson, C. Wood & D. R. Thomas
773 Comparative effects of selenite and selenate on nitrate assimilation in barley seedlings
M. Aslam, K. B. Harbit & R. C. Huffaker
783 Boundary layer properties of highly dissected leaves: an investigation using an electrochemical fluid tunnel
J. Gurevitch & P. H. Schuepp
793 Do detached root-cap cells influence bacteria associated with maize roots?
M. B. Gochnauer, L. J. Sealey & M. E. McCully
803 Epidermal focussing and effects upon photosynthetic light-harvesting in leaves of *Oxalis*
M. E. Poulson & T. C. Vogelmann
813 Regulation of phytochrome mRNA abundance in green oat leaves
C. L. Edwards & J. T. Colbert
821 A novel interaction of magnesium translocation with the supply of phosphorous to roots of grapevine (*Vitis vinifera* L.)
P. W. Skinner & M. A. Matthews
827 Study on the inheritance of seed primary dormancy and the ability to enter secondary dormancy in *Petunia*: influence of temperature, light and gibberellic acid on dormancy
J. Girard
833 Influence of nitrate and ammonium on the growth and 2, 4-diaminobutyric acid composition of flatpea (*Lathyrus sylvestris* L.)
L. Shen, J. G. Foster & D. M. Orcutt
839 Air pollution in the past recorded in width and stable carbon isotope composition of annual growth rings of Douglas-fir
B. Martin & E. K. Sutherland
845 Rapid concentration changes of phospho*enol*pyruvate carboxylase mRNA in detached leaves of *Mesembryanthemum crystallinum* L. in response to wilting and rehydration
J. M. Schmitt
851 The role of pH and ion transport in oligosaccharide-induced proteinase inhibitor accumulation in tomato plants
H. M. Doherty & D. J. Bowles
857 A new method for measuring ^{13}carbon abundance in tracer experiments: technical report
A. P. Sims, B. F. Folkes, A. P. Cavill & K. R. Parsley
871 Sampling *Atriplex* bladders: a comparison of methods: short communication
S. W. Breckle, H. Freitas & C. Reimann
875 Book reviews
879 Sources of variation in porometry data: letter to the editor
P. B. Reich & L. Middendorf

PART 9

881 RuBPCO kinetics and the mechanism of CO_2 entry in C_3 plants: commissioned review
F. Mächler, J. Müller & M. Dubach
893 Vascular transport and soybean nodule function. III: Implications of a continual phloem supply of carbon and water: opinion
K. B. Walsh
903 An examination of the advantages of C_3–C_4 intermediate photosynthesis in warm environments
W. S. Schuster & R. K. Monson
913 Poly(γ-glutamylcysteinyl)glycines or phytochelatins and their role in cadmium tolerance of *Silene vulgaris*
J. A. C. Verkleij, P. Koevoets, J. van't Riet, R. Bank, Y. Nijdam & W. H. Ernst
923 Investigation of the limitations to photosynthesis induced by leaf water deficit in field-grown sunflower (*Helianthus annuus* L.)
R. R. Wise, J. R. Frederick, D. M. Alm, D. M. Kramer, J. D. Hesketh, A. R. Crofts & D. R. Ort
931 Interaction of enriched CO_2 and water stress on the physiology of and biomass production in sweet potato grown in open-top chambers
N. C. Bhattacharya, D. R. Hileman, P. P. Ghosh, R. L. Musser, S. Bhattacharya & P. K. Biswas
941 How does a mistletoe affect the water, nitrogen and carbon balance of two mangrove ecosystem species?
A. Orczco, F. Rada, A. Azocar & G. Goldstein

949 Effects of water stress on oxygen, hydrogen and carbon isotope ratios in two species of cotton plants
D. Yakir, M. J. DeNiro & J. E. Ephrath
957 Water stress leads to a change of partitioning in favour of sucrose in heterotrophic cell suspension cultures of *Chenopodium rubrum*
J. Dancer, M. David & M. Stitt
965 Buoyancy effect on forced convection in the leaf boundary layer
M. Kitano & H. Eguchi
971 Ethylene-promoted ascorbate peroxidase activity protects plants against hydrogen peroxide, ozone and paraquat
H. Mehlhorn
977 Nocturnal citrate accumulation and its response to environmental stress in the CAM plant *Kalanchoe pinnata* (Lam.) Pers.
U. Lüttge
983 Differential responses of alpine and non-alpine *Aquilegia* species to increased ultraviolet-B radiation
R. A. Larson, W. J. Garrison & R. W. Carlson
989 The effect of light intensity and daylength on the β-dimethylsulphoniopropionate (DMSP) content of marine green macroalgae from Antarctica
U. Karsten, C. Wiencke & G. O. Kirst
995 Pressure-volume relationships in non-rehydrated tissue at various water deficits: short communication
M. E. Kubiske & M. D. Abrams
1001 Implications of non-uniform stomatal closure on gas exchange calculations: short communication
D. W. G. van Kraalingen
1005 Primordium initiation at the stem apex as the primary event controlling plant development: preliminary evidence from wheat for the regulation of leaf development: short communication
R. K. M. Hay & D. R. Kemp
1009 Book reviews
1013 Instructions to contributors